SOME DESCRIPTIONS OF NEW FORMS OF AUSTRALIAN ODONATA.

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(Plate xv.)

The following new species and subspecies are here recorded and described:—

Pseudocordulia elliptica, n.sp. 3.

Metathemis nigra xanthosticta, n.subsp., 32.

Metathemis guttata melanosoma, n.subsp., 32.

Austrogomphus angeli, n sp., $\mathfrak{F}Q$.

Diphlebia euphæoïdes cærulescens, n.subsp., 32.

Diphlebia hybridoïdes Tillyard, $Q(\mathcal{F})$ only described already).

Argiolestes chrysoïdes, n.sp.J.

Synlestes albicauda, n.sp., ₹Q.

1. Pseudocordulia elliptica, n.sp.

J. Total length 49, abdomen 37, forewing 32, hindwing 32 mm. Wings: neuration exactly as in Ps. circularis Tillyard; a white spot at base of costa in forewing; hindwing saffroned at base. Pterostigma 1.5 mm., black. Nodal Indicator [10-11, 7-9] Head: vertical tubercle fairly large, dark violet; 7, 9-11] front wide, hairy, very deeply cleft medially, dark brown, with deep violet reflections above; clypeus and labrum dark brown; labium medium brown. Thorax: prothorax brown, hairy. Meso- and metathorax deep steely metallic greenish, with light brown hairs. Legs black, brownish near coxæ. A b d o men slender; 1-2 rather narrow, 3 pinched in middle, 4-6 widening, 7-8 narrowing, 9-10 cylindrical; 1, with grey hairs above; 2, with dark brown auricles; all the rest jet black without spot. A ppend a ges: superior 1.5 mm., black, slightly forcipate; viewed from above, they form a slightly pointed oval; in profile, they are

slightly depressed, and carry, on the middle of the lower outer edge, a small obtuse tooth or spine. *Inferior* 1 mm., narrow subtriangular, hollow above; vertex blunt and distinctly bifid, showing two small tubercles (Plate xv., figs.1-2).

Q. Unknown.

Hab.—Kuranda, N. Queensland. Three males, taken by Mr. F. P. Dodd, on January 3rd, 1913, are now in my collection.

Type: 3, Coll. Tillyard.

This species is very close to $Ps.\ circularis^*$ Tillyard, the type of the genus, which also comes from Kuranda. The label "Kuranda, F. P. Dodd," covers, however, a large tract of country, so that the two species do not necessarily occur together in the same locality, but are, probably, geminate species separated by a watershed, or inhabiting two different types of creek. The chief differences are:— $Ps.\ circularis$ is smaller than $Ps.\ elliptica$; its head narrower, and with scarcely a trace of violet; its thorax and abdomen shorter; the wings are also shorter, and less saffroned at bases. The superior appendages are very distinct; those of $Ps.\ circularis$ being very much bent, so as to form a complete circle, the tips much depressed and meeting the tip of the inferior appendage, which is of the same length, and is pointed and scarcely bifid at tip.

2. METATHEMIS NIGRA XANTHOSTICTA, n. subsp.

Very distinct from the type-form, $M.\ nigra^{\dagger}$ Tillyard(Kuranda, N. Queensland). The chief points of distinction are:—Size somewhat larger; abdomen, 341, 43.5 mm.; hindwing, 34, 38.5 mm. Wings with slightly thicker and longer pterostigma, 32.5, 33 mm. Midlateral bands of thorax twice as wide as in type-form. Abdomen of male with segments 1-8 spotted with yellow as follows: 1, a dorsal triangle; 2, a transverse basal line; 3, a pair of basal spots, transversely elongate, a pair of conjoined round dorsal central spots; 4 like 3 but basal spots smaller; 5, ditto, but basal spots very small; 6-8 with a pair of nearly central

^{*} These Proceedings, 1908, xxxiii., p.743. + *Ibid.*, 1906, xxxi., p.489.

dorsal spots, separated by the dorsal ridge. Appendages of male similar to those of type-form, but hairier; inferior tubercle of 10 much hairier. Abdomen of female spotted with yellow as follows: 1, an oval or subtriangular dorsal spot; 2, a pair of widely separated central spots; 3-6, a pair of subtriangular or semioval basal spots, a pair of oval or diamond-shaped central dorsal spots, crossed by the black line of the carina; 8 with a pair of irregular elongate oval central spots almost touching dorsally; genitalia and appendages as in type-form; wings only slightly suffused, or hyaline (in type-form, they are deeply suffused with orange-brown in Q).

Hab.—Mount Tambourine, Queensland. December to January. Fairly common. I took a fine series of males, but not many females. The exuviæ were also secured.

3. METATHEMIS GUTTATA MELANOSOMA, n.subsp.

Very distinct, both from the type-form, *M. guttata* Selys, and from *M. guttata aurolineata* Tillyard, which, however, it occasionally approaches in that one or two specimens possess a trace of the golden dorsal thoracic lines.

The following are the chief differences from the type-form:—Frontal yellow spots rather smaller, more widely separated. Colouration of abdomen: 3, almost completely black; 1 with a large dorsal yellow spot; 2 with two very small flat basal spots and a pair of central spots; 8 with two central spots (occasionally absent). The female has, in addition, 3, a pair of fine short basal transverse lines, a pair of central points; 4, minute vestiges of same; 5-7, sometimes with a suspicion of the central points; but 8, without spot.

Hab.—Mount Tambourine, Queensland, December to January. Rather rare. I captured six males and two females only.

Types: ♂♀, Coll. Tillyard.

It is interesting to note that, of the four species of *Metathemis* known, one only (*M. virgula* Selys) seems to be practically constant in size and colouring throughout its range. The other three show a gradual change from large, much spotted forms in

their southern localities, to smaller and much blacker forms at their northern limits. These are shown in the following table:—

	M. guttata Selys.	M. brevistyla Selys.	M. nigra Tillyard.
Southern Limit Victoria.	Victoria.	Vietoria.	S. Queensland.
Southern (large, spotted) Form	M. guttata Selys.*	M. brevistyla Selys.*	M. xanthosticta, n.subsp.
ntermediate Forms	Intermediate Forms M. aurolineatat Tillyard (Dorrigo, N.S.W.). M. guttata var. pallida Tillyard (Illawarra, N.S.W.).		
Northern Limit S. Queensland.	S. Queensland.	Northern N.S.W. (? Queensland).	North Queensland.
Vorthern (smaller, black) Form	Porm	M. subjuncta# Tillyard. M. nigra Tillyard.	M. nigra Tillyard.
*The measurements orms of these two specie all but size. The localit W. brevistyla type seems +The	*The measurements of de Selys' types show that they are not actually as large as the common southern forms of these two species. I have not, however, given new names to these, as they seem to be typical in all but size. The locality of M. guttata type is not known, while the indication, "Port Denison, Q." for M. brevistyla type seems to be at least doubtful, and needs further investigation. †These Proceedings, 1912, xxxvii., p.575.	are not actually as large as th new names to these, as they se wn, while the indication, "Pc further investigation. ‡ Ibid., p.574.	as the common southern hey seem to be typical in , "Port Denison, Q." for p.574.

At Mount Tambourine, it was interesting to note that the large and handsome M. nigra xanthosticta, n.subsp., occurred on

the same creek as the small and very dark M. guttata melanosoma, n.subsp., the former being at its southernmost, and the latter at its northernmost limit, which coincide.

4. Austrogomphus angeli, n.sp.

3. Total length 39, abdomen 29, forewing 22, hindwing 21 mm. Wings saffroned at base for 1.2 mm. (more in immature specimens); pterostigma 2.2 mm, black with a brown centre. Nodal Indicator | 12, 7-8|; membranule very small, grey. Head: occiput black, 9,8 with a large semioval yellow patch; vertex black, with a yellow triangular spot; a broad black band along base of front, and a blackish line (sometimes absent) in suture between front and clypeus; all other parts yellow or greenish-yellow (the green supervening with age), and fairly covered with blackish hairs, except labium, which is dirty brownish-vellow, with a few whitish hairs. Thorax: prothorax black, a wide yellow collar in front; a pair of small round geminate spots on dorsum, and a lateral spot on each side. Meso- and metathorax black above, with a pair of very distinct and complete yellow "seven-marks," followed by a narrow humeral yellow band much pinched just before its backward end, where each enlarges into a conspicuous yellow spot situated just above the interalar ridge. On the sides, a black band follows the humeral yellow band, and there are two complete lateral black bands; the middle one of these three bands is somewhat irregular in shape, the lower one straight; between them lie two broader areas of yellow; also the large area below the lowest band is yellow (see diagram of thoracic colouring, Plate xv., fig.7). Underside dull yellowish. Notum black, with conspicuous yellow scuta and scutella, and yellow spots on wing-joins. Legs short, black, coxæ and underside of profemora yellow. Abdomen: 1-2 swollen, 3-6 very narrow, 7-10 clubbed. Colour black, marked with yellow as follows: a cross-bar on 1, and a dorsal stripe on 2, form a large and conspicuous T-mark, from the head of which projects a short yellow line; sides of 1-2, auricles, and genitalia largely yellow; lateral view of segment 2 as shown in fig.5 of Plate xv.; 3-6 with a fine dorsal line, slightly swollen basally; 3 with two large

triangular basal sublateral spots; 4-6 with a transverse basal band; 7 with a dorsal basal mark of irregular shape, with its apical point lying nearly at middle of segment, and followed by a remnant of the dorsal line; a yellow transverse line in suture between 7 and 8; large irregular sublateral spots on 7-9; 10, black Appendages: superior 1.8 mm., parallel, straight, cylindrical to near tips, which are sharply pointed; colour yellow, with bases and tips black; underneath, close to bases, each carries a small black hook projecting downwards and curved inwards behind the hooks of the inferior appendage: inferior 0.6 mm., black, consisting of two widely separated upturned hooks.(Plate xv., figs.3-4).

Q. Total length 42, abdomen 31, forewing 24, hindwing 23 mm. Differs from the male as follows: Wings much saffroned from base to nodus; pterostigma 2.7 mm., black line in suture above clypeus generally absent or obsolescent. Head and thorax marked as in 3. Occiput with two pairs of prominent black tubercles, the outer pair narrow, rather truncate, with a small yellow spot near middle; the inner pair wider, more rounded at tips, slightly hooked (Plate xv., fig.6). Two yellow lines on metafemora. Abdomen: 1-2 swollen, 3-10 fairly cylindrical, marked as in 3, but with dorsal mark of 2 much wider and dorsal lines of 3-6 more distinct; 8 with a basal yellow triangular patch running out apically into a fine dorsal line, on each side a sublateral band; 8-9 black, with sublateral basal spots, lying on the narrow projecting shelves of the two segments, formed by the tergites slightly enfolding the ventral parts; 10 black. Appendages 0.8 mm., yellow, subconical.

Hab.—Murray River, at Morgan, South Australia. December. Taken by Messrs. S. and F. Angel, of Adelaide, to whom I am indebted for a series of five males and six females, taken between 1909 and 1912.

Types: 3Q, Coll. Tillyard (3, December 28th; Q, December 27th, 1909).

I know of no other locality for this interesting and very distinct species, which I have much pleasure in naming after its discoverers, who took, at the same locality, the somewhat rare Austrogomphus australis Selys, also. The appendages of the male of A. angeli, n.sp., are very distinct from those of all other species, but come nearest, in form, to those of A. amphiclytus Selys. The new species also resembles the latter somewhat by its colour-scheme, but is easily distinguished from it by its much smaller size, by the bicolorous pterostigma, and by the two complete lateral bands of the thorax.

5. DIPHLEBIA EUPHŒOIDES CŒRULESCENS, n.subsp.

A beautifully marked race, which differs from the type-form, D. euphoeoïdes* Tillyard (Kuranda), as follows:—

- 3. Wings slightly narrower, the black clouding not quite so complete, but showing paler spaces in each cellule surrounded by dark pigment. Black bands of thorax, slightly thicker. Abdomen coloured as follows: 1, black with large central blue patches; 2, blue, with transverse black lines in sutures, a black dorsal line along basal half, enlarging into a large flat spade-shaped dorsal black spot towards apex; 3 as in type-form; 4-7 black with a pair of conspicuous basal blue spots (these segments are wholly black in type form); 8, blue, with a narrow elongate anchor-shaped dorsal black mark; 9, blue, with a short dorsal longitudinal black stripe along basal half, and two small central points of black; 10, black, with two round blue spots wide apart (closer in type-form); sutures of 8-10 broadly black.
- Q. Very similar to type-form, but with a generally darker colouration and an intensification of the black parts of the epieranial pattern.

Hab.—Mount Tambourine, Queensland. December-January, 1913. Not common; occurs mostly on the rocky creeks half-way down the mountain. I obtained a fair series of males and a smaller number of females.

Types: ♂♀, Coll. Tillyard.

There seems to be an almost exact parallel between the limits of distribution, and resulting variations of colour-scheme between this species and *Metathemis nigra*, already dealt with. In both

^{*} These Proceedings, 1907, xxxii., p.394.

cases, the type-form from the northern limit (Kuranda) is the darker, and at the southern limit (Mount Tambourine) a beautifully spotted form occurs.

6. DIPHLEBIA HYBRIDOIDES Tillyard.

The male of this species was described by me, These Proceedings, 1911, xxxvi., p. 587.

Q (unique). Total length 52, abdomen 39, forewing 38, hindwing 36:5 mm. Wings: neuration black, the whole wing slightly shaded with brown; pterostigma 3 mm., dark brown. Nodal Indicator [6-7, 24-25]. He ad: epicranium black, with three small brown [5-6, 20] marks near ocelli; clypeus jet black; labrum black, with two brown spots; gence and inside of orbits yellowish-brown; labium pale dirty-brownish. Thorax: prothorax black, with two reddish-brown touches, and a little brown on posterior border. Meso- and metathorax very dark brown, with black dorsal and humeral bands; lower part of sides and underside powdered with grey. Legs black, undersides of femora powdered with grey. A b d o men: 1-7 quite cylindrical, 8-10 somewhat clubbed. Colour jet-black; sides of 1 and underside of 2-8 slightly powdered with grey. Appendages 1 mm., sharply pointed, black.

3. It is necessary to add, to the already published description, the colouration of the thorax and abdomen, since the type-specimen was discoloured. Thorax: prothorax black, with two small brown spots well forward, two large central brown spots, and a short transverse brown mark behind. Meso- and metathorax rich brown (not blue as in other species), with black dorsal and humeral bands; sides brownish, shading to dull bluish below, a narrow sublateral black band in suture. A b d o men: 1 brownish, with a rectangular basal black blotch; 2-9 as described; 10 black; appendages black.

Note:—This species must not be confounded with the black-tipped form of *D. lestoïdes* Selys. In Victoria and the southern half of New South Wales, *D. lestoïdes* & has a milky bar across the wings, but the tips are quite clear. In the northern half of New

South Wales, and at Mount Tambourine, and other localities, in South Queensland, it has, in addition, in mature specimens, a strong black tip to the wings. In D. hybridoïdes, the black is not truly apical, as in this form of D. lestoïdes, but it is a broad præpterostigmatic band, though, in very mature specimens, a certain amount of obfuscation supervenes between it and the tip of the wing. Both sexes of D. hybridoïdes are of much slenderer build than D. lestoïdes; the abdomen is longer and narrower; the wings also longer and narrower, and the appendages of the male very different, and easily distinguished by the very sharp upcurved tips, and conspicuous inferior spine of the superior appendages. The female is distinguished also by its very dark head, with scarcely any brown epicranial pattern, and by the very long and slender wings.

Hab.—Kuranda, N. Queensland. I have received a good series of six males and one female, taken by Mr. F. P. Dodd, during December, 1912.

Types: ₹9,(Kuranda, F. P. Dodd), Coll. Tillyard.

7. Argiolestes chrysoides, n.sp.

3 (unique). Total length 41, abdomen 32.5, forewing 26, hindwing 25 mm. Wings: pterostigma 1.3 mm., black; postnodals 18-19 in forewing, 17 in hindwing. Head: eyes black; epicranium and clypeus dull black; labrum dark metallic purple, hairy; a pale yellow patch on genæ, extending to orbits; labium dull black. Thorax: prothorax black, with a pair of conspicuous dorsal yellow spots. Meso- and metathorax bright golden-yellow above, except for a narrow black border near prothorax, and a broad black patch above and surrounding interalar ridge; sides dark metallic purplish-black, with the yellow from above forming an irregular humeral band; irregular yellow patches near coxe and close to abdomen; notum black, crossed by a yellow band; scuta and scutella yellow; wing-joins black. Legs black, slender, with long slender spines on femora and tibiæ. Abdomen slender, cylindrical, 9-10 enlarged. Colour black, the basal half showing deep purplish reflections (1-4 distinctly, 5-6 less so). No spots.

A p p e n d a g e s: superior 1.5 mm., forcipate, black; seen from above, the basal two-thirds are thick, the apical third thinner and bent inwards; at the bend, on the inner side, is a slight swelling, and, on the outside, are three small spines; tip rounded; hairs very irregular; in profile, the thickness is almost uniform, the tips rather blunt and decurved; there are two small spines above, at the bend, and a moderately large inferior spine under the bend near the tip. Inferior very short, black, subtriangular in profile. (Plate xv., figs. 8 and 9).

Q. Unknown.

Hab.—Montville, Blackall Ranges, Queensland. This unique male was taken on a rocky creek in the scrub, on October 6th, 1912, by Dr. A. J. Turner, F.E.S., of Brisbane.

Type: Coll. Tillyard.

This beautiful species is closely allied to A. aureus* Tillyard, from Kuranda, North Queensland. The chief differences are:—In A. aureus, the pterostigma is much shorter (1 mm.); the front, clypeus and labrum are golden, and there are two golden spots on each side of prothorax. The gold markings of the thorax are very different. In A. aureus, a wedge of metallic steely black runs in from the interalar ridge along the dorsal ridge, thus cutting the gold in two; on the other hand, the sides of the thorax are nearly all golden in A. aureus. The abdomen of A. aureus has no purplish colouring, and there are small basal golden spots on 2 and 3. The superior appendages of A. aureus are slightly longer, and are without the inferior spine found in A. chrysoïdes.

8. Synlestes albicauda, n.sp.

3. Total length 53, abdomen 45, forewing 29, hindwing 28 mm. Wings: neuration fine, black; pterostigma 1.5 mm., thick, rather convex below, black with brown centre; quadrilateral shorter but broader than in S. weyersi Selys, 3; postnodals 19 in forewing, 14 in hindwing. He ad: total width 5.5 mm. Eyes rather large, bronze-grey shading to pale grey beneath; antennae slender, 3.5

^{*} These Proceedings, 1906, xxxi., p.178.

mm., basal joint swollen, whitish, second joint fairly slender, slightly swollen at tip, rather long, whitish shading to brown distally, rest very slender, dark. Epicranium metallic green, clupeus bronze, labrum dark metallic green, labium wide, dull, pale dirty straw-colour. Thorax: prothorax bronze, with a pale strawcoloured collar, and a thick irregular humeral band on each side, on which is partly isolated a conspicuous bronze point. Meso- and metathorax bronze above and on sides; a pair of conspicuous slanting posthumeral bands of cream or pale yellow, rather irregular, broadest near wings, and narrowing forwards; also a fine pale line on each side, in the lateral suture; underside and lower part of sides white touched with cream; notum dirty pale brownish, glau-Legs slender, rather long, coxe whitish, rest pale dirty brownish; elbows black; a black line on distal half of profemora; tibiæ with long slender spines. A b d o m e n very slender, 1-2 and 8-10 slightly enlarged. Colour dark bronze, marked with cream or pale yellow as follows: 1, a dorsal patch, and white underside; 2, lower part of sides, and underside enclosing brown genitalia; 3-7, a pair of basal subtriangular marks extending downwards along the sides to a sharp point apically, and joining one another basally underneath; 8, with same markings very low down, not visible dorsally; 9-10 dark bronze. Segment 10 of remarkable shape, being raised dorsally into two parallel ridges, from which the superior appendages arise; these ridges are concave inwards, and end in a conspicuous spine above; colour black. A p p e n d a g e s: superior, 2.7 mm., white, elongate, forcipate, and also bifid at their basal third; the inner forks 0.6 mm., short, straight, sharply pointed, converging to meet or cross inwards, a distinct rounded lobe on outer border; outer forks long, curved, often crossed at tips. Inferior reduced to two dull whitish tubercles. Apparently the superior appendages here play the double part of two sets of claspers often allotted to superiors plus inferiors together; or possibly the inferior forks play the part of spines. (Plate xv., figs. 10-11).

Q. Total length 49, abdomen 39, forewing, 30.5, hindwing 29 mm. It differs from the male as follows: pterostigma slightly larger,

paler in centre; postnodals 17 in fore, 13-14 in hindwing. Epicranium, clypeus and labrum bronze. Thorax with dull brown overlying the bronze dorsally; markings yellower in mature Q than in 3 both on thorax and abdomen, the usual colour being straw. Abdomen cylindrical, thicker than in 3, except 9, which is much swollen, 10 narrower: 1, with an apical whitish band; 3-8 with yellow markings larger than in 3, and spreading further apically along underside. Ovipositor black; 9, blackish; 10, narrow and short, 1.2 mm., white or creamy. Appendages 0.6 mm., straight, subconical, creamy; tips with a very fine sharp brownish point.

Hab.—Mount Tambourine, Queensland December-January. Twelve mature males, and three mature females were taken by me, between December 21st, 1912, and January 6th, 1913.

Types: 3Q, mature, taken in cop., January 2nd, 1913; Coll. Tillyard.

During the latter half of December, I found this insect emerging in large numbers from a deep pool of the creek, near the top of the mountain, in dense scrub. These were nearly all females, and exceedingly weak and flabby. In spite of the abundance of newlyemerged specimens, mature specimens were seldom met with. large percentage are caught and eaten by birds as they make their way from the pool; many more fall victims to rapacious spiders, both on land and water; and the remnant hide away in the dense scrub, where it is almost impossible to find them. I never caught more than two or three mature specimens in the course of a day's hunt, and only twice found them in cop. Their colouration is marvellously protective. When resting on the trunks of palms or treeferns, they are practically invisible, and will remain so still that they can be picked off with the hand. Also when flying in the halflight of the scrub, the wings are invisible, and the body nearly so. They are, curiously enough, only betrayed by the distinct white tip of the abdomen, which, I soon convinced myself, is actually necessary to enable the sexes to discover one another. The male, while sitting on a twig or trunk, arches his abdomen outwards, and moves his white appendages to and fro, while I have no doubt that the female uses the white tip of her abdomen in a similar manner.

These movements do not amount to so decided a courtship (as far as I could judge) as in the case of *Hemiphlebia mirabilis**, but are of an exactly similar nature, so that it is interesting to find two similar developments brought about by the same necessity, on two insects so differently coloured, and of so different a habitat.

This species is easily distinguished from *S. weyersi* Selys, the only other known member of the genus, both by its peculiar colouration, and by its remarkable appendages.

EXPLANATION OF PLATE XV.

Fig.1.— $Pseudocordulia\ elliptica,\ n.sp.,\ \delta$, appendages, dorsal view ($\times 12$).

Fig.2.— $Pseudocordulia\ elliptica,\ n.sp.,\ \delta$, appendages, lateral view (×12).

Fig.3.— $Austrogomphus\ angeli,\ \text{n.sp.},\ \delta$, appendages, dorsal view ($\times\,9).$

Fig.4.—Austrogomphus angeli, n.sp., δ , appendages, lateral view (×9).

Fig.5.—Austrogomphus angeli, n.sp., δ , lateral view of 2nd segment (\times 5).

Fig. 6.—Austrogomphus angeli, n. sp., \circ , occiput, showing hooks (×12).

Fig.7.— $Austrogomphus\ angeli,\ n.sp.,\ 3$, thoracic colour-pattern (\times 5).

Fig. 8. — $Argiolestes\ chrysoïdes,\ n.sp.,\ \delta$, appendages, dorsal view, right half ($\times 18$).

Fig.9.— $Argiolestes\ chrysoïdes,\ n.sp.,\ \delta$, appendages, lateral view (\times 18).

Fig. 10. — Synlestes albicauda, n.sp., δ , appendages, dorsal view (\times 18).

Fig. 11.—Synlestes albicauda, n.sp., δ , appendages, lateral view (×18).

^{*} These Proceedings, 1912, xxxvii., p.463.